

# Photoelectric Sensors: BC Series

## Color Mark Sensors

The BC series color mark sensors offer outstanding color matching accuracy for highly reliable and stable color detection. The sensors generate RGB light emitting diodes with 12-bit resolution processing for high color matching accuracy and offer 2 different detection modes with 3-step sensitivity adjustment. The W 1.24 x L 6.7 mm spot size allows the sensors to detect tiny targets and color marks. With an IP67 protection structure, the sensors can provide stable and error-free operation even in wet or dusty environments.

## Features

- \* Outstanding color matching accuracy
  - RGB light emitting diodes and 12-bit resolution
  - 2 detection modes (color only / color + intensity)
  - 3-step sensitivity adjustment for each mode (fine, normal, rough)
- \* External light interference reduction minimizes errors and allows stable detection
- \* Check reference color with teaching indicator
- \* Operation indicator (red LED), stability indicator (green LED), timer indicator (orange LED)
- \* Configure operation functions with external input from wiring
- \* W 1.24 x L 6.7 mm spot size for detection of tiny targets and color marks
- \* IP67 protection structure (IEC standard)



## BC Features

**1 Color Mark Sensors from Autonics**

The BC series color mark sensors detect colors of surfaces. The sensors emit RGB (red, green, and blue) LED light and calculate the reflected light by RGB ratio to check for a match with the set reference color.



**2 High Color Matching Accuracy**

**1) RGB (Red/Green/Blue) Light Emitting Diodes**

The BC series generates and emits red, green, and blue light emitting diodes for high level of color matching accuracy. With 12-bit resolution processing, the sensors are capable of 99.2% (average) color matching accuracy.



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## 99.2% Color Matching Accuracy

(Internal Test Results)

Teaching Color	Yellow	Red	Purple	306C	RohdRed	151C (Orange)	Blue	Green	403C (Black)	Black	White
Match Accuracy	99.6%	99.7%	99.8%	99.1%	99.7%	98.9%	99.5%	99.8%	96.9%	99.4%	99.8%

※ Testing Conditions: C + I Mode, Fine Sensitivity, 15 mm Detecting Distance, Pantone Uncoated 1729 Color

### 2) Two Detection Modes and 3-Step Sensitivity Adjustment

The BC series sensors are capable of C (color only) mode and C + I (color + intensity) mode for various applications. Fine, normal, and rough sensitivity settings are available in both modes, providing even more flexibility for users.

**C Mode**  
(Match color ratio)



**C + I Mode**  
(Match color + intensity ratio)



### 3 Check Reference Color with Teaching Indicator

After setting the reference color on the sensor, a similar shade of color will be displayed

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on the teaching indicator. Users can easily identify the reference color without having to re-teach the unit.

\*The teaching color and the color displayed on the teaching indicator may differ depending on environment conditions. (gloss, reflection angle, material, etc.)



Actual Color Displayed on Teaching Indicator

	Yellow	Red	Purple
Reference Color			
Display Color			
	Blue	7733U	368U
Reference Color			
Display Color			

**1.** Press the SET key in RUN mode



**2.** Hold the SET key for 3 seconds at the target color



**3.** Teaching complete!



⚠ In case of error, operation indicator (red LED) will flash every 0.5 sec



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## Various Status Indicators

Operation indicator (red LED) and stability indicator (green LED) allows users to quickly identify the operation status of the sensors.



Operation Indicator



Stability Indicator

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## Output Mode Switch (Color Match / Mismatch)

The output mode can be switched between color match (N.O) and color mismatch (N.C) modes using the output mode switch.



Output ON with color MATCH



Output ON with color MISMATCH

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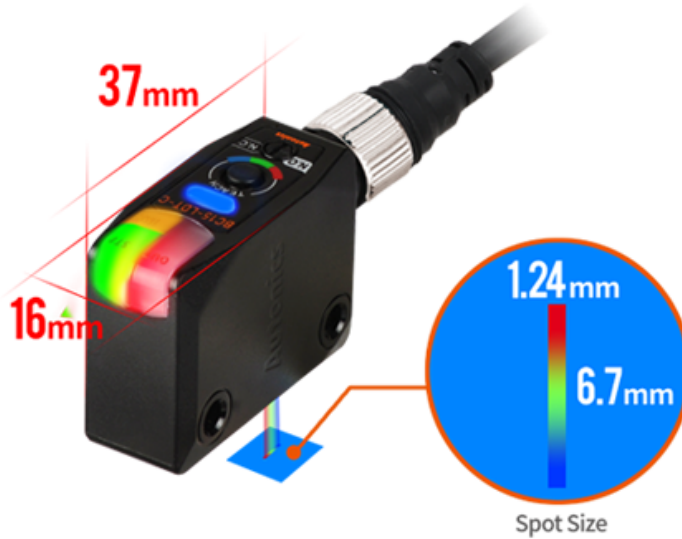




## 6 Detect Tiny Targets and Color Marks

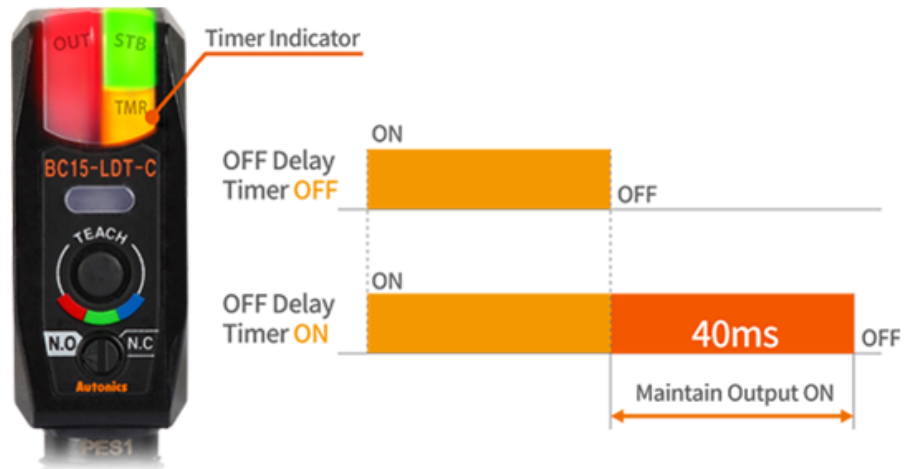
The compact sized (W 16 x L 37 mm) sensors feature W 1.24 x L 6.7 mm spot size for detection of tiny targets and color marks.

\*Detection distance: 15 mm



## 7 OFF Delay Timer

The 40 ms OFF delay timer allows stable detection of fast moving targets.



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## 9 Application



Detect presence of product labels



Detect errors during manufacturing process



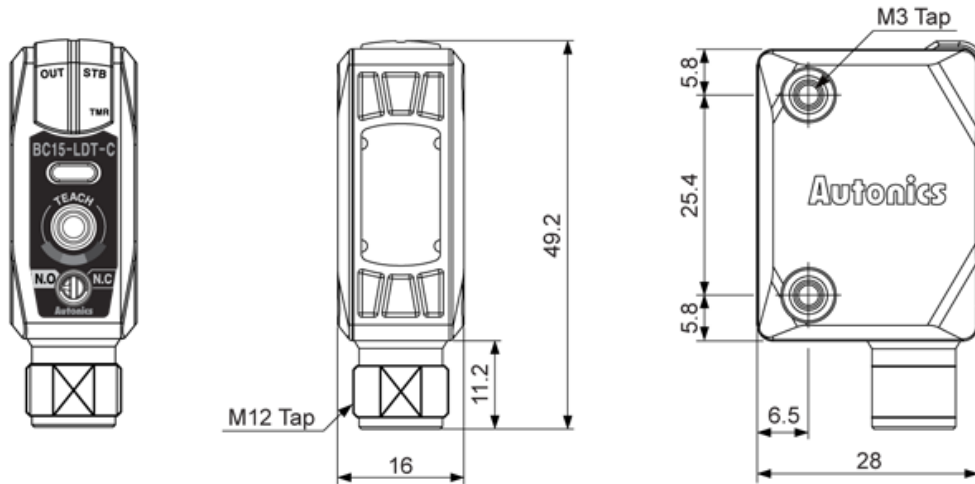
Check location of package stamping

Model	BC15-LDT-C	BC15-LDT-C-P
Sensing method	Convergent reflective type	
Sensing distance	15mm ±2mm	
Sensing target	Opaque, translucent	
Hysteresis	Max. 20% of sensing distance (may vary by sensing mode or sensitivity)	
Spot size	1.24×6.7mm (rectangular)	
Response time	500µs	
Power supply	12-24VDC ±10% (ripple P-P: max. 10%)	
Current consumption	Max. 30mA	
Light source	Full Color LED (red, green, blue)	
Sensing mode	C (color only) mode, C+I (color + intensity) mode	
Output mode	Color match output, color mismatch output	
Output timer	40ms OFF delay timer function	
Control output	NPN or PNP open collector output • Load voltage: max. 30V      • Load current: max. 100mA • Residual voltage - NPN: max. 1V , PNP: max. 2.5V	
Protection circuit	Reverse polarity protection, output short-circuit protection	
Indicator	Operation indicator: red LED, Stability indicator: green LED, Teaching indicator: full Color LED	
Connection method	Connector type	
External input	External SET cable input	
Insulation resistance	Over 20MΩ (at 500VDC megger)	
Noise immunity	±240V of square wave noise (pulse width: 1µs) from the noise simulator	
Dielectric strength	1,000VAC at 50/60Hz for 1min	
Vibration	1.5mm amplitude at 10 to 55Hz frequency in each X, Y, Z direction for 2 hours	
Shock	500m/s <sup>2</sup> (approx. 50G) in each X, Y, Z direction for 3 times	
Environment	Ambient illumination	Incandescent lamp: Max. 3,000lx (receiver illumination)
	Ambient temp.	-10 to 55°C, storage: -25 to 75°C
	Ambient humidity	35 to 85%RH, storage: 35 to 85%RH
Protection structure	IP67 (IEC standard)	
Material	Case: polycarbonate, Sensing part: acrylic, Bracket: stainless steel 304 , Bolt: carbon steel	
Accessories	Bracket, Fixing bolts: 2 , Adjustment screwdriver: 1	
Approval	CE	
Weight <sup>※1</sup>	Approx. 80g (approx. 14g)	

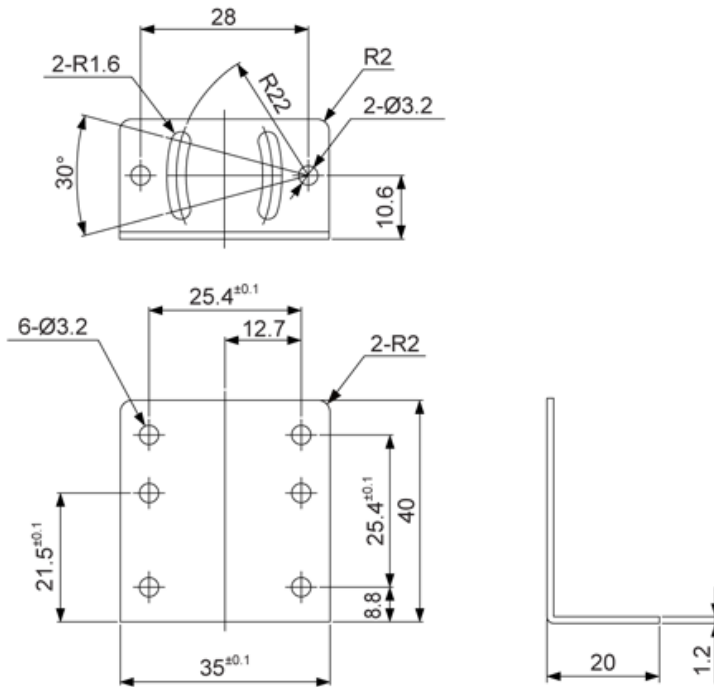
※1: The weight includes packaging. The weight in parenthesis is for unit only.

※The temperature and humidity of environment resistance is rated at non-freezing or condensation.

(unit: mm)



• **Mounting Bracket**



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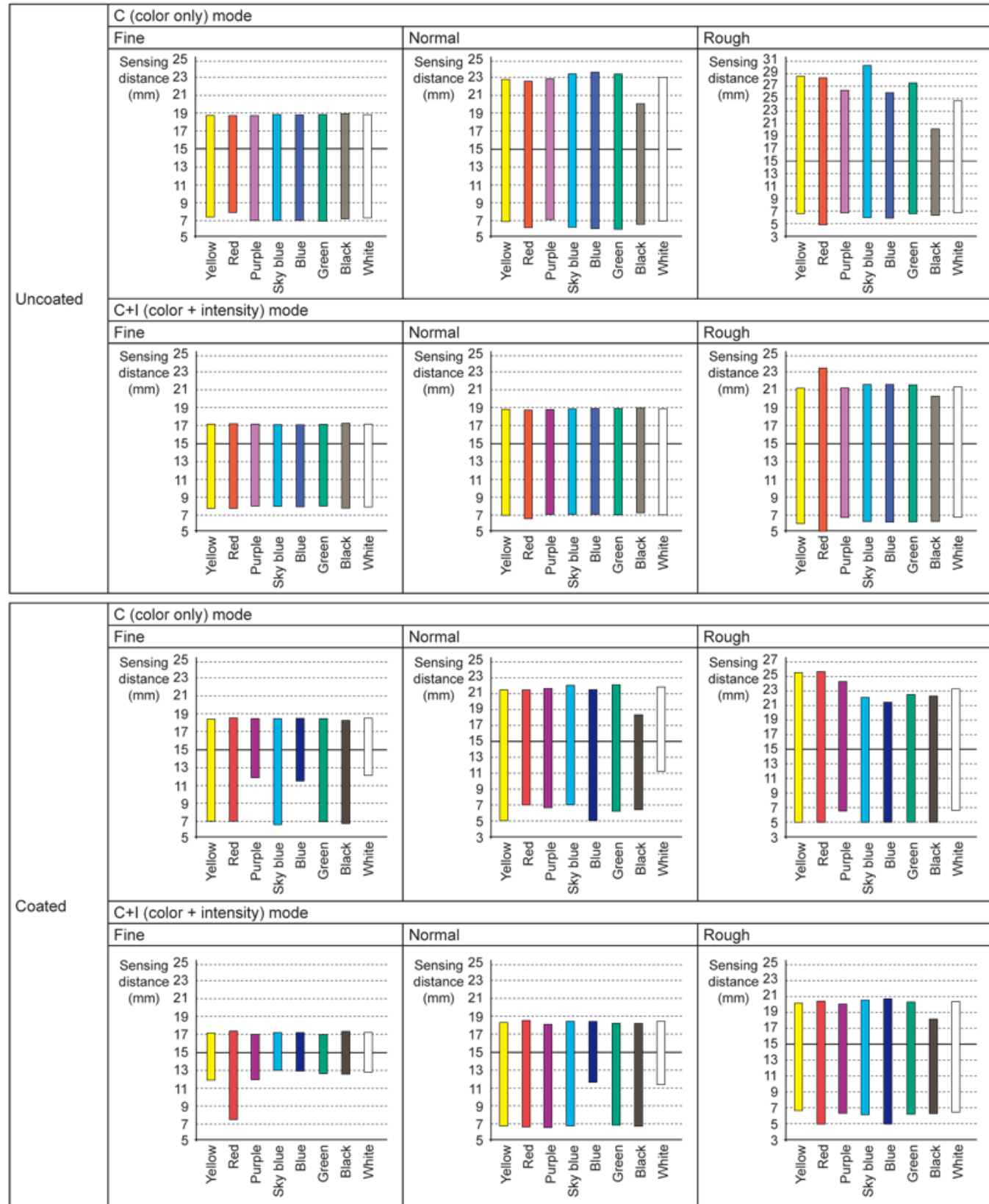




## BC Series Standard Sensing Color

Reference color		Yellow	Red	Purple	Sky blue	Blue	Green	Black	White
Color code	Uncoated	Yellow U	Red032U	Purple U	306U	Blue072U	Green U	405U	—
PANTONE Color code	Coated	Yellow C	Red032C	Purple C	306C	Blue072C	Green C	405C	—

## Color sensing distance by mode



## Color sensing angle by mode

